DOCUMENT RESUME

ED 055 237 VT 014 080

AUTHOR Impellitteri, Joseph T.; Kapes, Jerome T.

TITLE A Longitudinal Study of Vocational Development: Implications for Vocational Education and Guidance.

INSTITUTION Pennsylvania State Univ., University Park. Dept. of Vocational Education.

SPONS AGENCY Pennsylvania State Dept. of Education, Harrisburg. Bureau of Vocational, Technical, and Continuing Education.

PUB DATE Jul 71

NOTE 47p.

EDRS PRICE MF-$0.65 HC-$3.29

DESCRIPTORS Curriculum Planning; *Educational Experience; *High School Students; *Longitudinal Studies; Occupational Guidance; *Vocational Development; Vocational Education

ABSTRACT

To identify the effects of the senior high school experience on the vocational development of youth, a 10-year longitudinal study was undertaken to trace the development of ninth graders from three Pennsylvania school districts. Included in the study are all Altoona students who finished Grade 9 in 1969, and all the Hayleton and Williamsport students who completed Grade 9 two years later. This first report describes the total 10-year study and provides a reference point for future publications resulting from the study. Implications for curriculum planning and guidance are discussed. Although primarily applicable to the three districts involved, the findings are generalizable to other school systems. A related document is available as VT 014 081. (BH)

ED055237

THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF VOCATIONAL EDUCATION

A LONGITUDINAL STUDY OF VOCATIONAL DEVELOPMENT: IMPLICATIONS FOR VOCATIONAL EDUCATION AND GUIDANCE

JOSEPH T. IMPELLITTERI

JEROME T. KAPES

Pennsylvania Department of Education
Bureau of Vocational, Technical and Continuing Education

(Project No. 19-1013)

VOCATIONAL — TECHNICAL EDUCATION **Research Report**

VOCATIONAL DEVELOPMENT STUDY SERIES

VDS MONOGRAPH, NUMBER 1 JULY, 1971

ED055237

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

A Longitudinal Study of Vocational Development: Implications for Vocational Education and Guidance

Joseph T. Impellitteri

Jerome T. Kapes

The Pennsylvania State University
University Park, Pennsylvania

July, 1971

Pennsylvania Department of Education
Bureau of Vocational, Technical and Continuing Education

(Project No. 19-1013)

PREFACE

In the fall of 1968 a ten-year longitudinal study of vocational development was undertaken in the Department of Vocational Education at The Pennsylvania State University. The study emerged from the need to identify the effects of the senior high school experience upon the development of youth. Current plans include the continuous study of three separate samples of ninth grade students for a ten-year period ending seven years after each sample leaves high school. Through the evaluative evidence that is uncovered in this study it will be possible to draw implications to improve curriculum planning and to more adequately meet the guidance needs of youth.

From May 1, 1971 through June 30, 1972 the research activities described herein are being conducted with financial support through the Research Coordinating Unit of the Pennsylvania Bureau of Vocational, Technical, and Continuing Education. At the conclusion of this support period the first sample of students will have completed high school and the second and third samples (upon which two replications are based) will have completed tenth grade.

This first report is a description of the total planned program of research, its objectives, procedures, and multiplicity of interrelated studies. In addition to providing this descriptive function it is intended that this report will serve as a reference point for future research published within the framework of the Vocational Development Study.

As discussed within the report itself, the emphasis of this research effort is upon implementation of the findings that are uncovered while maintaining the necessary concern for the theoretical

implications which may emerge. The results are therefore most applicable to those school personnel from Altoona, Hazleton, and Williamsport, Pennsylvania from which the three samples of students were drawn. Because of the replicative nature of the research design incorporated in the study, however, specific findings corroborated within each of the three locations are expected to contribute to current educational theory as well as being generalizable to similar school systems.

Joseph T. Impellitteri,
Professor and Chairman
Graduate Studies and Research
Department of Vocational Education

TABLE OF CONTENTS

Page

PREFACE ii

BACKGROUND OF THE PROBLEM 1

The Developmental Framework 2

The Developmental Framework as an Approach to the Evaluation of Vocational Education 4

The Developmental Framework and Early Career-Related Decisions 5

SPECIFICATION OF THE PROBLEM 7

REVIEW OF RELATED RESEARCH 14

PROCEDURES 17

General Design 17

Population and Sample 18

Data and Instrumentation 19

Analysis 28

IMPLICATIONS 30

Implications for Curriculum Evaluation and Planning 31

Implications for Guidance 34

Summary 35

REFERENCES AND BIBLIOGRAPHY 37

BACKGROUND OF THE PROBLEM

During the decade of the 1960's there has been ample evidence and increasing agreement that both formal and semi-formal educational and training opportunities should be made available to all members of our society. The nature and intent of the federal legislation dealing with support of educational and training programs passed during that period have tended to render obsolete the notion of "terminal education." Some combination of education and training is currently conceived to be a lifelong process for most individuals in all roles of life--the professional, the technician, the skilled craftsman, the housewife, the semi-skilled factory worker, the clerical worker, the businessman, etc. A significant factor in bringing about this condition is the rapidly changing nature of our highly technological society. First, the individuals making up the society have a greater need for more education and training in order to succeed within it, regardless of the criteria utilized in measuring the attainment of that success. Second, in order for it to progress, the society itself produces an ever-increasing demand for persons with higher levels of skills and competencies which are attained only through additional education and training.

Given this condition of the contemporary "adult world" within which the school youngsters of today will eventually find themselves, how can they be better prepared to successfully enter it? What significant implications growing out of the societal condition, as described, may be helpful to those responsible for the preparation of our youth?

The Developmental Framework

The response to the previous questions provide the basis upon which a conceptual framework may be designed for use in studying the problem. The individual in today's society must be primarily visualized as evolving. Given the necessity of continuing education and training during most of his life, he is the sum total of what he is plus what he is becoming. The notion of education, then, as preparing youth for an activity or set of activities with which he will occupy himself for the remainder of his life is unacceptable. Education must prepare a youngster to enter society as a responsible and contributing member, but it also must develop in him the awareness that upon entry into that realm he should be ready and willing to adapt. Such a conception of the individual evolving over time, which may be referred to as the developmental framework, prompts the educator to formulate his educational objectives and consequent programs in the same frame.

The Framework as Applied to Vocational Education

For those educators charged with the responsibility for developing and implementing the career-oriented phase of the total school curriculum, the developmental framework holds particular potential. Support for this contention lies in the fact that an individual's vocational behavior is the most direct manifestation of his total development (Jordaan; Starischevsky; Super; 1963). Yet, so little is known about the process of the vocational development of both youth and adults, and the nature of various factors related to it (Holland and Whitney, 1969) that vocational educators are rightfully dubious about the usefulness of vocational development theory. How are they to devise vocational programs which take vocational development into account, when the

conceptual handles from which such programs would proceed are insufficiently established?

Several noteworthy research studies have been conducted to explore the nature of vocational development (Super; Gribbons and Lohnes; Cooley and Lohnes; etc.). In their lack of orientation to vocational education opportunities, however, they have ignored the potential applications to that field. Given their exclusion of the impact of existing vocational education programs, the findings of these investigations have little practical applicability to it.

In an extensive review of selected research and evaluative studies in vocational and technical education Little (1970) has recently recommended that the void which exists must be filled:

> One important need is for a comprehensive longitudinal study of the in-school and post-school careers of cohorts of persons who move through the educational system along different paths. It would seem that it is as important to know what happens to the generality of youth in the educational system as to learn about the gifted as seen in the Terman studies of genius, or in the more recent Project TALENT (Little, 1970, p. 37).

Interpretation of Little's recommendation leads one to the necessity for studying a significantly large group of pre-vocational students through their experiences in the vocational program, and through their post-school experiences as well. Yet, how does one go about identifying the pre-vocational junior high school student? Given that only 15-20 percent of the youngsters who start senior high school eventually receive four-year college degrees, 80-85 percent of a ninth grade population may be viewed as potential vocational students in the broad sense of the term. The most reasonable procedure which would allow a determination of the effects of vocational education in relative and absolute terms is to start with a sample including the entire cross-section

of junior high school students. Utilizing this procedure certain problems such as tracing the movement of youngsters in and out of the vocational program at various times may be surmounted.

The Developmental Framework as an Approach to the Evaluation of Vocational Education

In examining and analyzing the various vocational stages of an individual's development from his junior high school years through the first seven years after his scheduled graduation from high school, information could be obtained that not only provides for description, but also for evaluation. Typical follow-up or evaluative studies in vocational education as exemplified by recent reports by Eninger (1968), Kaufman, et.al. (1967), Little (1967), Mallinson (1968), and Kaufman and Lewis (1968), are concerned only with the out-of-school experiences of vocational education graduates. Their failure to provide information regarding the nature of the inputs to the vocational education program (the type of youngster who typically selects such programs) so that valid inferences regarding effects of the program may be made, is of major significance. Knowledge of the type of input into the vocational program takes on added importance given the dictates of the Vocational Amendments of 1968, that vocational education shall be charged with meeting the needs of the "disadvantaged" as well as other sectors of our society. The value of input data and developmental data along a time continuum is thus of primary importance when considered in this context. Failure to provide such data within the evaluative model will certainly lead to faulty assessments.

In the developmental model program outcomes in terms of selected affective and achievement variables at one grade level become part of the input in order to assess the outcomes of the experience at the next

grade level. At each stage where relevant data are collected, the same data may be viewed as both output and input. This procedure allows not only for the interpretation of the effectiveness of the complex package (say, a three-year auto mechanics program), but also for the evaluation of any portion of the complete package of sufficient importance to be isolated from it.

The Developmental Framework and Early Career-Related Decisions

In The Vocational Maturity of Ninth Grade Boys Super and Overstreet (1960) attempted to answer a number of questions concerning the readiness of ninth grade boys to choose among several different curricula. "Are their aptitudes, interest, and personality traits sufficiently developed? Are their vocational aspirations sufficiently stable? Do they know the world of work and of education sufficiently well?" (p. vii) Although much of the monograph dealt with the development of the vocational maturity construct the authors did report conclusions relevant to the readiness question.

> ...the date of this study suggests that a substantial number of boys are not yet ready, in the ninth grade, to decide on direction of endeavor, or, specifically, on a future occupation. This early adolescent stage is one, not of making and implementing a vocational choice, but rather of development planfulness, of preparing to make a series of educational and occupational decisions. (p. 152)

The authors further stated:

> But the lack of relationship between consistency of vocational preferences, wisdom of preferences, and other measures, together with the number of boys whose choices are unwise, judging by their aptitudes, interests, or socioeconomic resources, suggest that the typical ninth-grader does not understand himself and his potentialities as well as he should in order to choose between levels, and still less among fields of endeavor as reflected in the curricular alternatives open to him. (p. 153)

Although these studies provided evidence to question the advisability of allowing youth to prepare for specific occupations in high school,

the majority of our current school systems do require some very specific educational decisions concerning preparation for a career. If we consider the two curricular choices most often available to boys (vocational or academic), we find some very specific choices required. While the academic boy has considerable flexibility, the boy who chooses the vocational curriculum usually must select a particular occupational training program, or one for a cluster of occupations. Although the students in the two curriculums may differ considerably in their occupational choices, their biggest differences are probably in the type of high school experiences they have chosen and will receive. One student has chosen an experience which is very specific, tangible and leading immediately to employment after high school, and the other has chosen an educational path leading to more educational preparation and resulting in the formulation of quite nebulous and distant goals.

While it may be helpful to know that ninth graders are not typically ready to make specific occupational and educational choices, the reality of the situation often requires that they do so. Students in schools across the country make this choice whether it is done advisedly or not. Although such a decision is not irreversible, these educational paths gradually lead to significantly different directions. Upon what basis, then, do students make such an important choice of educational path?

What student characteristics are predictive of the choice between the occupationally specific vocational curriculum and the occupationally broad academic curriculum? If Super is correct, are those boys who choose the vocational curriculum more prepared and capable of specific choices than those who choose the more flexible and less specific academic curriculum? How much of this choice is due to intelligence

or other specific abilities? Is the choice a function of values or interests and if interests are specific enough, will a student choose a vocational curriculum? How much of the decision is influenced by the environment, the home and family? It is probably true that all of these factors are somewhat important, but their exact relationship is difficult to predict.

SPECIFICATION OF THE PROBLEM

It was upon the rationale developed in the previous section that the Department of Vocational Education at The Pennsylvania State University initiated a long-range research program in cooperation with responsible personnel from the Altoona School District and the Altoona Area Vocational-Technical School during the late fall of 1968. At its initiation this research program was conceived to be the first phase of a multiphase effort, the following two stages being undertaken during the 1970-1971 academic year in which the cooperation of the Williamsport School District and the Hazleton School District was obtained.

This research study planned to cover a ten-year span, has been designed to examine two distinct areas of concern: those that have implications for curriculum evaluation, and those having implications for vocational guidance. These two problem areas are presented and described within this subsection in an outline form. The design incorporates three separate analyses for each specific problem (one for each sample), resulting in a double cross-validation.

I. Problems having curriculum evaluation implications

   A. $Time_1$ (T_1) when sample [Altoona (A), Hazleton (H), and Williamsport (W)] leave ninth grade and begin tenth grade.

1. The nature of the inputs into the various curriculums [Vocational (total, plus each distinct shop or laboratory area)/Academic/General/Business/Home Economics] in terms of the variables listed below:

   a. Personal

      i. Cognitive

         (a) Aptitude

         (b) Achievement

      ii. Affective

         (a) Vocational Maturity

         (b) Occupational Values

         (c) Tentative occupational aspirations

         (d) Tentative educational plans

         (e) Interests and hobbies

      iii. Experiential

         (a) School attendance record (grades 7-9)

         (b) School grade record (Grades 7-9)

         (c) Health status

         (d) Other personal factors

   b. Environmental

      i. Socioeconomic status of family

      ii. Father's and mother's occupational status and level

      iii. Father's and mother's educational status and level

      iv. Number of siblings in family unit

      v. Characteristics of the regional labor market

      vi. Other miscellaneous environmental influences

2. A comparison and analysis of the differences in those characteristics listed in #1 between the five major curriculums and among the distinct vocational shop or laboratory areas.

B. T_2, when sample (A, H and W) completes tenth grade

1. An analysis of the differential effects of the programs (Vocational/Academic/General/Business/Home Economics) upon students' changes in vocational maturity level, changes in occupational values, changes in occupational aspirations and educational plans, the stability of occupational aspirations over time, the stability of educational plans over time, their stated satisfaction level with the program they have entered, and their self-concepts when the effects of significant variables listed in A.1. are considered.

2. Analysis of the differential effects of the individual vocational shop and laboratory courses of study (auto mechanics, auto body, carpentry, machine shop, etc.) upon those same changes as referred to in #1, immediately above.

3. An analysis of the relationship between the characteristics listed in #1 and degree of success in each curriculum.

C. T_4, when sample of vocational students (A, H and W) in selected shop and laboratory areas complete twelfth grade.

1. An anlaysis of the differential effects of the individual vocational shop and laboratory courses of

study upon achievement on the Ohio Trade Achievement Test (OTAT) when compared to a national norm.

2. An exploration and validation of the OTAT in terms of its relationship with shop grades, mechanical aptitudes, prior achievement, and degree of work experience possessed by the sample.

D. T_5, when samples (A, H, W) after graduation have been out of school for approximately one year

1. An analysis of the differential effects of the programs (Vocational/Academic/General/Business/Home Economics) upon the students' occupational or educational status, occupational or educational mobility, occupational or educational performance, and degree of satisfaction with current occupational or educational pursuits, when the effects of significant variables listed in A.1 and B.1 are considered.

2. An analysis of the differential effects of the individual vocational shop and laboratory courses of study (auto mechanics, auto body, carpentry, machine shop, etc.) upon those same dependent variables listed in D.1.

E. T_6, when samples (A, H, W) after graduation have been out of school for approximately four years

1. An analysis of the differential effects of the programs (Vocational/Academic/General/Business/Home Economics) upon the students' occupational or educational status, occupational or educational mobility, occupational or educational performance, and degree of satisfaction with

current occupational or educational pursuits, when the effects of significant variables listed in A.1, B.1 and D.1 are considered.

2. An analysis of the differential effects of the individual vocational shop and laboratory courses of study (auto mechanics, auto body, carpentry, machine shop, etc.) upon those same dependent variables listed in E.1.

F. T_7, when samples (A, H, W) after graduation have been out of school for approximately seven years

1. An analysis of the differential effects of the programs (Vocational/Academic/General/Business/Home Economics) upon the students' occupational or educational status, occupational or educational mobility, occupational or educational performance, and degree of satisfaction with current occupational or educational pursuits, when the effects of significant variables listed in A.1, B.1, D.1, and E.1 are considered.

2. An analysis of the differential effects of the individual vocational shop and laboratory courses of study (auto mechanics, auto body, carpentry, machine shop, etc.) upon those same dependent variables listed in F.1.

II. Problems having vocational guidance implications

A. Validation of a variety of tests and inventories with potential for the guidance of students in the selection of various school programs.

1. The General Aptitude Test Battery (GATB): Because this test is currently emerging as a popular instrument to be utilized in selection of students for specific vocational programs, evidence as to its reliability at the ninth grade and validity for that stated purpose will be examined. A stability coefficient for each of the nine aptitudes will be calculated between ninth grade (form B) and twelfth grade (form A) based on the sample of students from Altoona. In addition, various empirical and construct validities will be obtained.
2. The Occupational Values Inventory (OVI): Because of the absence of values measures which are reliable for use with ninth graders, and valid for career relevant guidance, the OVI will be examined in terms of its: internal consistency; stability over two, four and six weeks, one and two years; factorial validity; predictive validity in terms of occupational and educational achievement and satisfaction; and a variety of concurrent and construct validities.
3. The Ohio Vocational Interest Survey (OVIS): Because this instrument's design was based upon an occupational framework (the D.O.T.'s data-people-things) it was included as relevant for use with ninth graders. Since it has only been recently developed, however, little evidence is available to support its validity for vocational guidance purposes. The OVIS thus will be examined in terms of its various concurrent, predictive and construct validities.

4. The Vocational Preference Inventory (VPI): Since the VPI allows for measuring both the individual's career orientation and the occupational orientation of the environment (both school and work) it is planned for inclusion in the proposed study. There is meager evidence, however, relating to its use for the vocational guidance of ninth and tenth graders. It is proposed that the various concurrent, predictive, and construct validities of the VPI be examined.
5. The Vocational Development Inventory (VDI): As one of the few estimates of vocational maturity, the VDI has been widely field-tested and normed. Based on its potential use in the vocational guidance of youth, the validity of the VDI for predicting job satisfaction and job performance will be examined.

B. The nature and stability of career paths (including intentions and actual experiences) plotted over time, as related to selected student characteristics (general school achievement index, SES of family, aptitudes, interests, vocational maturity, type of school program entered at tenth grade, occupational values, etc.

1. What are the differentiating characteristics of those students who exhibit a highly stable career path (measured in terms of occupational level and field)?
2. What are the differentiating characteristics of those students who exhibit a highly unstable career path (measured in terms of occupational level and field)?

3. What are the differentiating characteristics of those students who exhibit a stable career path in terms of level, but vary in terms of field?
4. What are the differentiating characteristics of those students who exhibit a stable career path in terms of field but vary in terms of level?
5. What are the differentiating characteristics of those students who select entry occupations which require an extensive delay of gratification?
6. What are the differentiating characteristics of those students who select entry occupations which require little delay of gratification?
7. What are the differentiating characteristics of those students whose occupational aspirations are much higher than their observed attainment as measured by entry job obtained?
8. What are the differentiating characteristics of those students whose occupational aspirations are at the same level as their observed attainment as measured by entry job obtained?

REVIEW OF RELATED RESEARCH

In order to identify other research studies or published materials which contain relevant information for his study a review of the literature was conducted. The studies reviewed were grouped into the following categories:

1. Studies designed to evaluate the differential effects of vocational education programs: Bournazos (1963), Eninger (1968),

Kaufman, et. al. (1967), Kaufman and Lewis (1968), Little (1967), Little (1970), Mallinson (1968), Moss (1968), Olien and Donohue (1968), Pucel, and others (1970), U.S. Department of Health, Education and Welfare (1968), Whinfield (1969), and Young (1968).

2. Studies in career development which relate specifically to the theoretical aspects of this study: American Psychological Association (1969); Gribbons and Lohnes (1968); Super (1953), (1957), (1961), (1963b), and (1969); Super, Crites, Hummel, Moser, Overstreet, and Warnath (1957); Super and Overstreet (1960); Tiedeman (1961); and Tiedeman and O'Hara (1963).
3. Studies in career development, psychology or sociology which relate to the student characteristics of interest in this study: Crites (1965), (1969); Crites and Semler (1967); Dipboy and Anderson (1959); Dutt (1968); Foote (1960); Ghiselli (1966); Gribbons and Lohnes (1965), (1966); Hollingshead (1949); Hummel and Sprinthall (1965); Impellitteri and Kapes (1969), (1970); Impellitteri and others (1969); Katz (1963); Kapes (1969a); Kapes (1969b); Lohnes (1966); Long and Kapes (1970); Miller and Haller (1964); Singer and Stefflre (1954); Super (1960), (1962); Thomas (1956); Weiss and others (1969); Wysong (1965) and Zytowski (1970).
4. Studies in career development and in the behavioral sciences which relate to the methodology and techniques used in this study: Astin (1967a), (1967b); Cooley and Lohnes (1968); Flanagan and others (1962); Gribbons, Halperin and Lohnes (1966); Lohnes (1965); Prediger (1970); Pucel and others (1970);

Rulon (1951); Thorndike and Hagen (1959); Tiedeman (1951); Tatsuoka (1957) and Werts (1968).

Of the information uncovered in the review of related literature the following appear relevant for this study.

1. A longitudinal study of an entire group of students must be conducted in order to uncover differential effects of vocational education programs.
2. It is essential to include in the evaluative model appropriate labor market information.
3. It is important to investigate both in-school and out-of-school effects of educational programs.
4. It is necessary to obtain "satisfaction" data as well as "satisfactoriness" data for inclusion in the evaluative model.
5. Developmental theory has evolved considerably due to recent research.
6. The developmental framework appears to lend itself well to the type of study designed herein.
7. The concept of stages of career development is fairly well accepted among vocational development researchers.
8. The career model appears to have replaced the occupational model in much of vocational development research.
9. Most career development researchers are in agreement concerning the end of ninth grade as a critical decision point needing further study.
10. Success and satisfaction are important aspects of vocational adjustment.
11. Ability measures are still the most useful measures for predicting success.

12. Multiple aptitude tests are the most complete ability measures available.
13. Vocational maturity appears to be a useful and valid career development construct.
14. Occupational values as a predecessor to interest are receiving much attention in vocational development research.
15. Parental occupational and education levels in addition to other family socioeconomic characteristics place limits on one's educational and occupational opportunities.
16. Multivariate statistical procedures have become much more available in recent years due mostly to computerization, and these techniques are improving research in the behavioral sciences.
17. Multiple regression analysis appears to be one of the more useful statistical techniques for longitudinal research in the behavioral sciences.
18. Discriminant function analysis appears to be the most appropriate statistical technique for working with multiple groups.

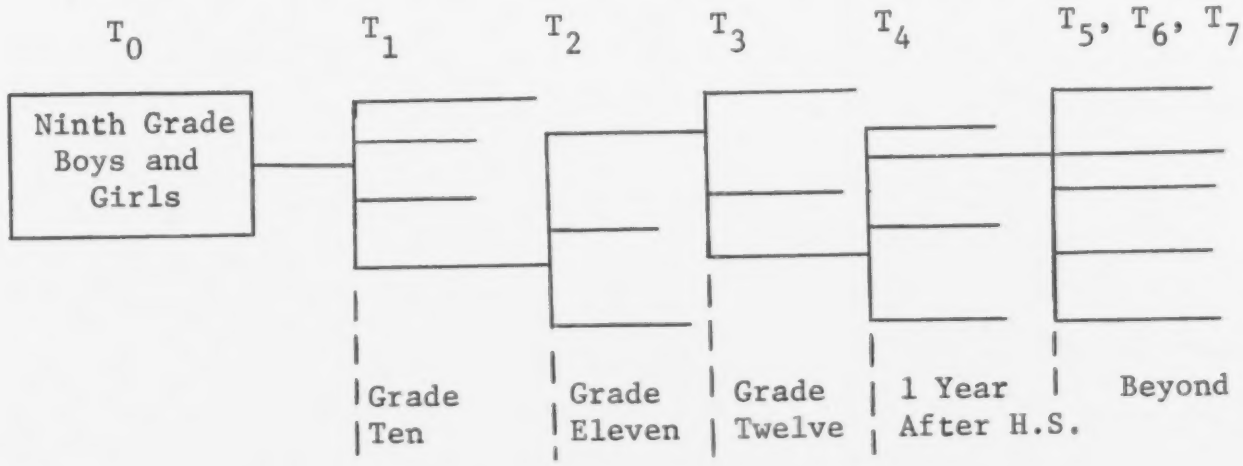
PROCEDURES

General Design

The general design for this study is longitudinal and developmental, encompassing the movement of students over time along various paths. Specifically, this means that students involved in many different courses of study will be compared in order to make judgments about effects of those courses of study. Longitudinal design is appropriate and necessary because it is the only way to take into consideration the

dynamic nature of the interaction between the students and the curriculum. The significant variables in this study are many and include both student characteristics and program characteristics as well as numerous intervening environmental influences. No simple classification of independent and dependent variables is possible in a study of this nature because a dependent variable at T_1 can be considered to be an independent variable at T_2.

The visual representation of a study of this nature can be likened to a tree with many branches.



As a tree grows and as each new shoot becomes a limb from which next year's shoot will spring, so does the movement of a student through our educational environment progress. As is stated in the problems section, significant points along the many possible branches have been selected for study because of their relevance for curriculum evaluation and vocational guidance. The rationale for the inclusion of the variables selected is provided in the section on data and instrumentation.

Population and Sample

The population to which the results of this study may be generalized consists of American adolescents who could be described as typical of the dominant American culture. To the extent that one considers there

to be no dominant American culture, but instead a collection of American subcultures, this study will, of course, generalize more to those subcultures which resemble the sample more closely. Furthermore, it is felt that the sample selected for study is as representative of those groups whom we attempt to serve in our educational institutions through providing vocational education opportunities as any sample of its size which could be collected from three community settings.

The sample selected consists of the total ninth grade enrollment in three medium size Pennsylvania school districts: Altoona (A), Hazleton (H) and Williamsport (W). Initial data on the A sample was collected in the spring and summer of 1969 when that group was completing ninth grade. Additional data on the A sample was gathered in 1970 during the tenth grade year for that group and again in 1971 at eleventh grade. The size of the A sample is approximately 1200 students and the data file is approximately 90 percent complete at this time. Table I provides greater detail concerning the A sample and essential data.

Data on the H and W sample was collected during the 1970-71 school year in the various junior high schools where the students were attending ninth grade. The H sample contained approximately 1200 students and the W sample approximately 900 students. The time schedule to be followed in collecting data from the H and W sample is approximately the same as that indicated for the A sample except for the two-year differences involved at all points.

Data and Instrumentation

In order to establish a rationale for the use of certain student characteristics, program characteristics and environmental data in a longitudinal study of this nature, previous studies in vocational

Table I

A Description of the Data Essential
In Characterizing the Altoona Sample: 1966-1973

	Collected 68-69			Coll. 69-71		To be Coll.	
Year	66-67	67-68	68-69	69-70	70-71	71-72	72-73
Nature of Data / Grade	7	8	9	10	11	12	+1 Yr
School Grades	X	X	X	X	X	X	
Personal Traits	X	X	X				
Attendance	X	X	X				
Health Status	X	X	X				
Academic Promise Test (APT)		X					
California Test of Mental Maturity (CTMM)		X					
California Achievement Test (CAT)		X					
General Aptitude Test Battery (GATB)			X			X	
Biographical Information			X			X	
Hobbies and Interests			X			X	
Educational Plans			X	X		X	
Occupational Aspirations			X	X		X	
Occupational Values Inventory (OVI)			X	X		X	
Vocational Development Inventory (VDI)			X	X		X	
H.S. Curriculum				X	X	X	
Vocational Preference Inventory (VPI)					X		
Ohio Trade Achievement Test (OTAT)					X	X	
Ohio Vocational Interest Survey (OVIS)						X	
College Entrance Exam Board (CEEB)						X	
Other Achievement Tests						X	
Other Ability Tests						X	
Post H.S. Occupational Status							X
Post H.S. Educational Status							X
School or Job Satisfaction							X
School or Job Success							X

development and program evaluation were reviewed. Use of this data is briefly reviewed in the "Specification of the Problem." The following is a description of the data selected along with a rationale for why each was selected and how its measure will be obtained.

1. Ability Measures--Almost any study involving students needs to take into account the concept of ability or aptitudes. Since the development of the construct of intelligence by Binet, many more types of ability measures have been created, validated and studied with increasing degrees of sophistication. Super and Overstreet (1960) selected only a single ability measure (Otis Quick-Scoring) for their vocational maturity study. Cooley and Lohnes (1968) in Project Talent used 60 ability variables to establish 11 ability factors, but suggest that these factors could be substituted for by the use of commercially available batteries such as the General Aptitude Test Battery (GATB) and the Differential Aptitude Tests (DAT). Cooley and Lohnes state:

> We think that these results suggest that a series of equating studies involving a representative group of commercial batteries and a suitable sample of subjects would establish acceptable alternative procedures for scaling the MAP ability factors, ...(p. 1-31).

In choosing an appropriate commercial battery for this study consideration was given to its appropriateness for vocational as well as academic students. On the basis of previous studies, Impellitteri and Kapes (1969), the GATB was selected because it contained manipulative as well as cognitive abilities and the manipulative ability scores were shown to be related to vocational students' shop grades.

The GATB was developed by the United States Employment Service (USES) in 1947 for use in employment counseling with adults and was later extended for use at the ninth and tenth grade level. The battery takes approximately two and one quarter hours to administer and is composed of 12 subtests which yield the following aptitude scores.

G - Intelligence--General learning ability. The ability to "catch on" or understand instructions and underlying principles; the ability to reason and make judgments. Closely related to doing well in school.

V - Verbal Aptitude--The ability to understand meaning of words and to use them effectively. The ability to comprehend language, to understand relationships between words and to understand meanings of whole sentences and paragraphs.

N - Numerical Aptitude--Ability to perform arithmetic operations quickly and accurately.

S - Spatial Aptitude--Ability to think visually of geometric forms and to comprehend the two-dimensional representation of three-dimensional objects. The ability to recognize the relationships resulting from the movement of objects in space.

P - Form Perception--Ability to perceive pertinent detail in objects or in pictorial or graphic material. Ability to make visual comparisons and discriminations and see slight differences in shapes and shadings of figures and widths and lengths of lines.

Q - Clerical Perception--Ability to perceive pertinent detail in verbal and tabular material. Ability to observe differences in copy, to proof read words and numbers, and to avoid perceptual errors in arithmetic computation.

K - Motor Coordination--Ability to coordinate eyes and hands or fingers rapidly and accurately in making precise movements with speed. Ability to make a movement response accurately and swiftly.

F - Finger Dexterity--Ability to move the fingers and manipulate small objects with the fingers, rapidly and accurately.

M - Manual Dexterity--Ability to move the hands easily and skillfully. Ability to work with the hands in placing and turning motions.

2. Occupational Values--Next to abilities, interests and values appear to be the most powerful determinants of vocational choice. In recent years, occupational values have received much attention and studies of the occupational values of adolescents have probably outnumbered those concerned with occupational interest. This is probably due to the concept of values as predecessors to interests as indicated by Katz (1963). Studies concerning the occupational values of adolescents have been undertaken by Singer and Stefflre (1954), Dipboye and Anderson (1959), Super (1962), Gribbons and Lohnes (1965) and (1967), Thompson (1966), and many others. Cooley and Lohnes (1968) state in the case of their study, "Some aspects of the values of adolescents are quantified by the MAP motives, but much is missing. We wish we had something like the Allport-Vernon-Lindzey 'Study of Values' among our MAP indicators, for example."

Although a number of instruments for the measurement of occupational values have been developed the instrument selected for this study is the Occupational Values Inventory (OVI) which has been under development for the past several years. A monograph by Impellitteri and Kapes (1971) describes the development of this instrument and reports preliminary validation studies. The unique contribution of this instrument is that it contains actual "valuing tasks" in an ipsative format phrased in a language easily understood by ninth graders. The following seven occupational values are assessed by the OVI:

a. Interest and Satisfaction--One likes the work; enjoys it; is happy at it; fulfills oneself by doing it.

b. Advancement--One perceives the opportunity to get ahead in the work; sees a good future in it; it provides an opportunity to improve oneself.

c. Salary--One perceives the financial return resulting from the work; can make a good living at it; sees it as an opportunity for a good income.

d. Prestige--One is impressed by the respectability attached to the work; can earn recognition from it; desires the feeling of importance that goes with it.

e. Personal Goal--One sees the work as fitting into his way of life; is what one always wanted to do; has been shooting for it; it's the ideal.

f. Preparation and Ability--One can succeed in the work; is good at it; it's where one's talents lie; is suited to it.

g. Security--One can obtain employment in this work; perceives that workers are needed in it; there will always be openings in it.

3. Vocational Interests and Preferences--In any study of vocational development and curriculum evaluation it is necessary to have some measure of occupational interests and preferences. For the purpose of this study, two such measures have been selected. The Ohio Vocational Interest Survey (OVIS) and the Vocational Preference Inventory (VPI).

The OVIS is a recently developed interest inventory (D'Costa et.al., 1970) designed to be used along with the Dictionary of Occupational Titles (DOT). The current edition of DOT (1965) lists 21,741 occupations and 114 homogeneous worker-trait groups. The OVIS plots these groups in a data-people-things cubistic model. The following 24 interest scales are included in the OVIS: Manual Work, Machine Work, Personal Services, Caring for People or Animals, Clerical Work,

Inspecting and Testing, Crafts and Precise Operations, Customer Services, Nursing and Related Technical Services, Skilled Personal Services, Training, Literary, Numerical, Appraisal, Agriculture, Applied Technology, Promotion and Communication, Management and Supervision, Artistic, Sales Representative, Music, Entertainment and Performing Arts, Teaching, Counseling and Social Work, Medical. The time required to administer the OVIS is approximately 1 and 1/2 hours.

The VPI has been developed by Holland (1965) in order to test his theory of vocational development. Although this instrument has been used extensively with college bound students [Ashby, Osipow and Wall (1966), (1966), (1967)], little evidence of its appropriateness for use with vocational students presently exists. The VPI consists of 160 occupational title items and takes approximately 15 minutes to administer. The following six occupational personality scales are included in the VPI: Realistic, Intellectual, Social, Convential, Enterprising, and Artistic.

4. Vocational Maturity--One of the first constructs to evolve from research undertaken by Super in his Career Pattern Study (CPS) was that of "vocational maturity." Super (1957) states that "the concept of vocational development leads logically to that of vocational maturity" (p. 185). The following definition of vocational maturity is provided by Super (1957):

> Vocational Maturity is used to denote the degree of development, the place reached on the continuum of vocational development from exploration to decline. Vocational maturity may be thought of as vocational age, conceptually similar to mental age in early adolescence, but practically different in late adolescence and early adulthood because more distinctions can be made in the developmental curve at those stages (p. 186).

Super and Overstreet (1960) report the results of a study of the vocational maturity of ninth grade boys from which they conclude that many ninth grade boys are not yet ready to make specific occupational choices.

Since the issue of ninth grade choice is central to this study it is necessary to include a measure of vocational maturity. Crites (1965), (1969) has developed an instrument to measure vocational maturity called the Vocational Development Inventory (VDI). The VDI which consists of 50 items, is easily administered and yields a single score, has been selected for inclusion in this study. In addition to studies undertaken by Crites to validate the VDI, Impellitteri and others (1969) and Pucel and others (1970) have shown the usefulness of this instrument in studies involving vocational and technical students.

5. Family and environmental background measures--In reviewing studies in economics, sociology and vocational development it was found that various measures of family background were included in many of the studies. One of the earliest studies to explore the relationship between family background and occupational choice was undertaken by Hollingshead (1949) in a small mid-western community. Super (1957, Ch. 7) discusses

the role of the family in vocational development and reviews previous research in this area. Super and Overstreet (1960) have included a number of family background variables in their study of the vocational maturity of ninth grade boys. Among the variables they used were parental occupational level, house rating, parents' educational level and cultural stimulation. Gribbons and Lohnes (1968) in a study similar to Super's included a socioeconomic status variable computed using Hamburger's revision of Warner's scale and father's educational level as a second variable. Kaufman et al. (1967) in a cost-benefit analysis of vocational vs. academic education has included a number of family background variables such as city of graduation, father's education, marital status and race.

Among the family background and environmental variables included in this study are socioeconomic status of family, occupational status of family, educational status of family, family composition, regional labor market characteristics and miscellaneous other background information. Most family background information will be gathered by direct questionnaire.

6. Occupational and Educational Aspirations--Because some of the questions to be answered by this study include the nature and stability of occupational paths, both occupational and educational plans and aspirations are necessary information to obtain. The need and usefulness of such data in a study of this type has been attested to by many such as Cooley and Lohnes (1968); Super (1957), (1960); and Gribbons and Lohnes (1968).

7. School generated data--As a result of the student's interaction with the school system much useful data is generated which is descriptive of the student's normal progression through the system. This data is necessary in order to take into account each student's unique experiences as well as for the purpose of specific studies involving various aspects of the school program. For this reason the following school data will be obtained from the school files: attendance records, course grades, achievement test scores, health status and personal traits. Satisfaction information will also be gathered from the student himself through the use of a satisfaction index designed for that purpose.

Analysis

After reviewing the literature concerning longitudinal studies in both vocational development and curriculum evaluation, it was decided that the most appropriate methodologies for use in this study are those of the multivariate type. The two multivariate statistical metholologies which will be used in conducting most of the analyses proposed in the specification of the problem are multiple regression analysis (MRA) and multiple linear discriminant function analysis (MLDFA).

The multiple regression model used here is capable of handling both quantitative and categorical variables and is of the following form:

$$y = a_o + a_1 x_1 + a_2 x_2 + \ldots + a_k x_k + e$$

where

y = dependent variable

$x_1, x_2, \ldots x_k$ = independent variable

$a_o, a_1, a_2, \ldots a_k$ = partial regression coefficients

e = error term

Through the use of multiple regression analysis it is possible to partial out the effects of k-1 independent variables which result in the isolation of the unique contribution to the dependent variable made by the kth independent variable. This unique contribution holds true only for that exact set of k variables included in the equation. The addition or subtraction of variables to this set would result in a redistribution of the explainable variance among the new set of independent variables. The meaningfulness of the partial regression coefficients then are dependent upon the theoretical meaningfulness of the variables included in the equation. With this consideration in mind the variables included in each analysis will be selected.

A number of studies have been undertaken which demonstrate the usefulness of this particular methodology. Kaufman et al. (1967) have applied this approach to cost-benefit studies of vocational education. Moss (1968) has suggested its use in program evaluation and Impellitteri et al. (1969) and Kapes (1969c) have explored its use in career development research.

The computer program selected for this analysis was written by Hallberg (1969) and is available under the title of QSASE at the Penn State Computation Center. This program also provides for a test of the statistical significance of each partial regression coefficient.

When the criterion or dependent variable is membership in one or the other of two distinct groups (such as vocational vs. academic) the analysis can be carried out using multiple regression. When more than two groups are to be compared (such as machine shop vs. carpentry vs. printing vs. etc.) MRA is not possible and MLDFA becomes necessary and appropriate.

The purpose of MLDFA is to maximize the explainable variance when more than two groups are considered. When using this technique, it is possible to extract k-1 discriminant functions although two discriminant functions are usually sufficient to account for most of the explainable variance. Using these two discriminant functions then it will be possible to plot the groups of interest in two discriminant spaces instead of the original variable space. In this way, both visually and by use of Wilks' Lambda and the Chi Square statistics, differences among groups can be analyzed.

A number of researchers over the past twenty years have advocated the use of MLDFA in career development research. Only recently, however, has the technique become more readily available with the advancement in computer technology. Rulon (1951) and Tiedeman (1951) have pioneered the use of this technique in guidance type research, but more recently Lohnes (1966) and Cooley and Lohnes (1968) have applied it extensively to Project Talent data. Prediger (1970) has used MLDFA in the study of various vocational technical program differences. Super (1969b), has discussed the use of MLDFA and other multivariate techniques as promising career development research tools of the future.

Although multivariate type analysis will be used in many cases, there will be many other occasions when conventional ANOVA and zero-order correlations will also be used.

IMPLICATIONS

In the presentation of the problem the twofold purpose of this investigation was introduced to provide evidence for curriculum evaluation and planning; and to explore relationships between a variety of personal and environmental factors and vocational development of

adolescents and young adults. Because of its close cooperation with the Altoona, Hazleton, and Williamsport School District personnel at both the planning and operational phases it is anticipated that the implementation of recommendations forthcoming from this program of research will be facilitated. This implementation component is an essential aspect of the program, and is viewed as such by both the researchers and practitioners on the team.

Implications for Curriculum Evaluation and Planning

Based upon the longitudinal design of the investigation, information regarding education/training performance and job performance is to be collected at five points in time: at the conclusion of the tenth grade; at the time of high school graduation; and one, four, and seven years out of high school. Additional information is to be collected at those same points to indicate degree of satisfaction with the education/training program and with jobs. These ten indicators of success (satisfaction and performance each collected at five points in time) plus mobility, pay, and degree of career path stability are to serve as the criteria against which selected input information collected at ninth grade and the program variables will be compared. The effect of high school program selected (for instance, the choices available in Altoona are vocational, secretarial, academic, home economics and academic business) upon each of the criteria are to be isolated by controlling for the effects of the input and intervening variables in a multiple linear regression model.

It will thus be possible to assess whether students in the vocational program as compared with students in the other programs:

1. exhibit more, less, or equally stable career paths;

2. are more, less, or equally satisfied with their work;
3. perform their jobs better, worse, or as well;
4. receive more, less, or an equal amount of yearly pay for their work;
5. are more, less, or equally mobile;
6. exhibit similar or different changes in work satisfaction between entry and seven years later;
7. demonstrate more, less, or an equal amount of improvement in job performance between entry and seven years later;
8. receive more, less, or an equal amount of pay raise over the projected six-year work period.

In the same manner the differential effects of the specific occupational courses of study within the vocational program upon the eight outcomes listed previously will be assessed. Additional outcomes will be examined, however, in comparing the effects of specific courses of study within the vocational program. These additional outcomes will be: nature of the entry level job; relatedness of the entry level job to the area of training; the length of time needed to obtain first job; and the amount of post high school education and/or training obtained.

Interpretation of whatever results are revealed from these analyses will not only provide extremely valuable direction to the secondary school personnel within each district sampled (Altoona, Hazleton, and Williamsport), but also to other similar districts throughout the Commonwealth of Pennsylvania with similar characteristics as A, H, and W. The generalizability of these findings is made possible because of the three independent replications of these analyses in the three locations. Corroboration of the findings among the three settings

would be an important condition upon which generalizability will be based. Lack of agreement among the three settings would certainly argue against generalizing with regard to a particular analysis.

Specific implications for the secondary school curriculum coordinator, the vocational director, and the vocational teacher would certainly emerge even if the analyses conducted as part of this study were based merely on follow-up information. The added component introduced within this investigation which will increase the meaningfulness of the results uncovered is in its accounting for differences among the students prior to their entering their senior high school program. As most of us will acknowledge, the youngster who is identified as "most likely to succeed" in ninth grade will probably succeed in senior high school regardless of the particular course of study he chooses to enter. Is his ultimate success, then, primarily a function of the program in which he enrolled, or a function of his own potential prior to entering the program? Controlling for entry characteristics allows for the identification of the unique effect of the program upon the youngster, and is thus an extremely powerful procedure.

Because this programmatic research effort was initiated within a vocational education context, certain biases tend to flavor its emphases. The future of vocational education conceived as the career-oriented phase of a school's curriculum needs to be planned, and the research being conducted herein is at least partially designed to aid in that planning task. The curriculum implications anticipated as an outgrowth of this effort are to effect not only the vocational education program as it exists, but the total school curriculum as well. In fact, it is within the broad curriculum area, of which vocational education is a significant part, that this study is focused.

Implications for Guidance

The curriculum evaluation and planning phase of this investigation was designed to reveal the nature of the youngsters who select different senior high school programs, and to uncover the differential impact of those programs upon a youngster's development and attainments. The other aspect of the twofold concern which motivated the investigators to initiate such a study was to help youngsters in making a decision at ninth grade as to which senior high school program would be most suitable for them. The former question to be answered is, "Who are the students who enter the various programs, and what happens to them as a result of choosing that program?" An equally important question to be answered in the study is, "What help can be provided to youngsters so that they will make suitable program choices?" This latter question lies primarily in the area of guidance, two phases of which are investigated herein--an examination of the validity and reliability of five occupationally-relevant tests and inventories for counseling use (GATB, OVI, OVIS, VDI and VPI): and an exploration of the degree to which selected career development frameworks are valid in explaining the vocational behavior of the individuals included in the sample over time.

Each of the tests and inventories utilized as part of the study's data collection phase have shown potential for use in the counseling of students. The specific question to be answered here is, "For a school system with a wide range of vocational offerings, how reliable (stable and internally consistent) and valid within each system are the instruments for use in counseling ninth through twelfth grade students?"

Special efforts will be made by qualified members of the project staff to interpret the analyses of the various tests and inventories to all counselors within each school district. Recommendations formulated by the project staff will be discussed in meetings with the appropriate counselor group. Counselor reactions to those recommendations will open up communication regarding the implementation phase. Those actions stemming from the recommendations which the counselor group agrees are favorable will be cooperatively undertaken by the counselors and project representatives. The ultimate objective is to transfer the initiative for undertaking the resulting tasks to the counselors as part of their regular function.

The final focus of this investigation is upon the testing of a variety of conceptual frameworks designed to explain aspects of vocational behavior. Selected portions of Super's self-concept approach, Holland's typological framework, and Cooley and Lohnes' career development tree construct will be applied and expanded within the ten-year span of development for each of the three samples. Although the emphasis in this effort is upon primarily theoretical implications, recommendations stemming from this research will also be submitted to appropriate counselor groups for reaction. Counselors' awareness and understanding of the research undertaken in this phase of the project is deemed essential to the total success of the project.

Summary

The value of any research effort may be measured in terms of any one or more of four criteria: (1) the degree to which its recommendations are actually implemented; (2) the importance of its contribution to our accumulation of knowledge in a field; (3) the degree to which it

stimulates other related research efforts; and (4) the impact it has upon the refining of theory in a field of study. The investigation described in this paper has been designed to achieve at least a minimal level of each of these criteria. Its priorities, however, have been arranged as the list of criteria, with the highest listed first. Achieving a significant amount of the latter three, therefore, would not be as essential as attaining the first. Having achieved the first, the authors would feel their efforts have been of some worth.

References and Bibliography

American Psychological Association, Division of Counseling Psychology. "Vocational Development Theory," The Counseling Psychologist, 1969, 1, No. 1.

Ashby, Jefferson D., Wall, Harvey W., and Osipow, Samuel H. "Vocational Certainly and Indecision in College Freshman." Personnel and Guidance Journal, 1966, 44, 1037-1041.

Astin, Helen S. "Career Development During the High School Years." Journal of Counseling Psychology, 1967, 14, 94-98.

Astin, Helen S. "Patterns of Career Choice Over Time." Personnel and Guidance Journal, 1967, 46, 541-546.

Bournozos, Kimon. Vocational Education: Its Effects on Career Patterns of High School Graduates. East Lansing, Michigan: Bureau of Educational Research Services, College of Education, Michigan State University, September, 1963.

Cooley, William W., and Lohnes, Paul R. Predicting Development of Young Adults. (Interim report 5 to the U.S. Office of Education, Cooperative Research Project No. 3051) Palo Alto: Project TALENT Office, American Institutes for Research and University of Pittsburgh, 1968.

Crites, John O. "The Measurement of Vocational Maturity in Adolescence: I. The Attitude Test of the Vocational Development Inventory." Psychological Monographs, American Psychological Association, 1965.

Crites, John O. and Samler, I. J. "Adjustment, Educational Achievement, and Vocational Maturity as Dimensions of Development in Adolescence." Journal of Counseling Psychology, 1967, 14, 489-496.

Crites, John O. The Maturity of Vocational Attitudes in Adolescence. Iowa City, Iowa: University of Iowa, 1969.

D'Costa, Ayres G., Winefordner, David W., Odgers, John G. and Koons, Paul B. Jr. Ohio Vocational Interest Survey: Manual for Interpreting. New York: Harcourt, Brace, Jovanovich, Inc., 1970.

Dipboye, W. J. and Anderson, W. F. "The Ordering of Occupational Values by High School Freshman and Seniors." Personnel and Guidance Journal, 1959, 121-124.

Dutt, Karl. "Report of Preliminary Results on Vocational Readiness of Eighth and Ninth Grade Vocational-Technical Students." Easton, Pennsylvania, 1968. (unpublished manuscript)

Eninger, Max U. The Process and Product of Trade and Industry High School Level Vocational Education in the United States. Pittsburgh, Pennsylvania: Educational Systems Research Institute, April, 1968.

Flanagan, J. C., Darley, J. F., Shaycoft, M. F., Gorham, W. A., Orr, D. B., Goldberg, I. Design for a Study of American Youth. Boston: Houghton Mifflin, 1962.

Foote, Richard P. "The Prediction of Success in Auto Mechanics in a Vocational Industrial Curriculum on the Secondary Level." Unpublished doctoral thesis, New York University, 1960 (DA 21: 3014).

Gheselli, Edwin E. The Validity of Occupational Aptitude Tests. New York: Wesley, 1966.

Ginzberg, E., Ginsberg, S. W., Axelrad, S. and Herma, J. L. Occupational Choice: An Approach to a General Theory. New York: Columbia University Press, 1951.

Ginzberg, Eli. "Toward a Theory of Occupational Choice." Personnel and Guidance Journal, 1952, 30, 491-494.

Gribbons, Warren D. and Lohnes, Paul R. "Shifts in Adolescent Vocational Values." Personnel and Guidance Journal, 1965, 44, 248-257.

Gribbons, Warren D., Halperin, S., Lohnes, Paul R. "Application of Stochastic Models in Research on Career Development." Journal of Counseling Psychology, 1966, 13, 403-408.

Gribbons, Warren D. and Lohnes, Paul R. "A Five Year Study of Students' Educational Aspirations." Vocational Guidance Quarterly, 1966, 15, 66-70.

Gribbons, Warren D. and Lohnes, Paul R. Emerging Careers. New York: Teachers College Press, Columbia University, 1968.

Hallberg, M. C. Statistical Analysis of Single Equation Stochastic Models Using the Digital Computer. University Park, Pennsylvania: The Pennsylvania State University, Department of Agricultural Economics and Rural Sociology, Monograph 78, February, 1969 (revised February, 1970).

Holland, John L. Manual: Vocational Preference Inventory. Palo Alto: Consulting Psychologist Press, Inc. (Educational Research Associates), 1965, (Sixth Revision).

Holland, John L. and Whitney, Douglas R. "Career Development." Review of Educational Research, 1969, 30, 227-237.

Hollingshead, A. B. Elmstown's Youth: The Impact of Social Classes on Adolescents. New York: John Wiley and Sons, Inc., 1949.

Hummel, Robert and Sprinthall, Norman A. "Underachievement Related to Interest, Attitudes and Values." Personnel and Guidance Journal, 1965, 388-395.

Impellitteri, Joseph T. and Kapes, Jerome T. "Using the GATB with Vocational or Technical Bound Ninth Grade Boys." Vocational Guidance Quarterly, 1969, 18, 59-64.

Impellitteri, Joseph T., Kapes, Jerome T., Sievert, Norman W. and Wiersteiner, S. Richard. "Factors Related to the Occupational Values and Vocational Maturity of a Selected Sample of Ninth Graders." Paper presented at the American Vocational Association, Boston, December, 1969.

Impellitteri, Joseph T. and Kapes Jerome T. "The Measurement of Occupational Values." University Park, Pennsylvania: Department of Vocational Education, Pennsylvania State University, 1970.

Katz, Martin. Decisions and Values: A Rationale for Secondary School Guidance. New York: College Entrance Examination Board, 1963.

Kapes, Jerome T. Exploring the Use of the GATB with Vocational-Technical Bound Ninth Grade Boys. University Park, Pennsylvania: Department of Vocational Education, The Pennsylvania State University, January 1969, Research Series, Number 3.

Kapes, Jerome T. "Exploring the Use of the GATB with Ninth Grade Boys." Paper presented at American Personnel and Guidance Association, Las Vegas, March, 1969.

Kapes, Jerome T. "The Occupational Values of Ninth Graders who Select a Vocational vs. a Non-Vocational Curriculum in High School." (Unpublished paper, December, 1969)

Kaufman, Jacob J., Stromsdorfer, Ernst W., Hu, Teh-Wei, and Lee, Mou Lin. An Analysis of the Comparative Costs and Benefits of Vocational Versus Academic Education in Secondary Schools. University Park, Pennsylvania: Institute for Research on Human Resources, The Pennsylvania State University, October, 1967.

Kaufman, Jacob J. and Lewis, Morgan V. The Potential of Vocational Education: Observations and Conclusions. University Park, Pennsylvania: Institute for Research on Human Resources, The Pennsylvania State University, May, 1968.

Little, J. Kenneth. "The Occupations of Non-College Youth." American Educational Research Journal, March, 1967, 147-153.

Little, J. Kenneth. Review and Synthesis of Research on the Placement and Follow-up of Vocational Education Students. Columbus, Ohio: The Center for Vocational and Technical Education, The Ohio State University, February, 1970, (Research Series No. 49, UT-010-175).

Lohnes, Paul R. "Markov Models for Human Development Research." Journal of Counseling Psychology, 1965, 12, 322-327.

Mallinson, George G. Characteristics of Non-College Vocationally-Oriented School Leavers and Graduates. Kalamazoo, Michigan: Western Michigan University, February, 1968.

Long, Thomas E. and Kapes, Jerome T. "Exploring the Use of the Ohio Trade and Industrial Education Achievement Tests." Paper presented at the American Vocational Association, New Orleans, 1970.

Miller, I. W. and Haller, A. O. "A Measure of Level of Occupational Aspiration." Personnel and Guidance Journal, 1964, 42, 488-455.

Moss, Jerome Jr. The Evaluation of Occupational Education Programs. Minneapolis, Minnesota: Research Coordination Unit in Occupational Education, University of Minnesota, Technical Report, September, 1968.

Osipow, Samuel H., Ashby, Jefferson D., and Wall, Harvey W. "Personality Types and Vocational Choice: A Test of Holland's Theory." Personnel and Guidance Journal, 1966, 45, 37-42.

Olien C. and Donahue, G. A. Occupational and Educational Attainment of Women as Related to High School Occupational Expectations and Background Factors. Minneapolis, Minnesota: Department of Sociology, University of Minnesota, 1968 (mimeographed paper).

Prediger, Dale J. Validation of Counseling-Selection Data for Vocational School Students. (Final report U.S. Office of Education, Project No. 5-1169),Toledo, Ohio: University of Toledo, June, 1970.

Pucel, David J., Nelson, Howard F., and Wheeler, David N. Differentiating Among Graduates of Vocational-Technical Curriculums. (Project MINI-SCORE) Minneapolis: University of Minnesota, Department of Industrial Education, July, 1970.

Pucel, David J., Nelson, Howard F., Heitzman, Darrell, and Wheeler, David N. "Vocational Maturity and Vocational Training." Paper presented at the American Vocational Association, New Oreleans, 1970.

Reiss, Albert J. Jr. Occupations and Social Status. New York: The Free Press of Glencoe, Inc., 1961.

Roe, Ann. Psychology of Occupations. New York: John Wiley and Sons, Inc., 1956.

Roe, Ann and Siegelman, Marvin. The Origin of Interests. Washington: American Personnel and Guidance Association, APGA Inquiry Studies, Number One, 1964.

Rulon, Paul J. "Distinction Between Discriminant and Regression Analysis and a Geometric Interpretation of the Discriminant Function." Harvard Educational Review, 1951, 21, 80-90.

Samuelson, C. E. "The General Aptitude Test Battery in Predicting Success of Vocational School Students." Journal of Educational Research, 1956, 50-3, 175-182.

Shartle, Carroll L. Occupational Information: Its Development and Application. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1959.

Singer, Stanley L. and Stefflre, Bufford. "The Relationships of Job Values and Desires to Vocational Aspirations of Adolescents." The Journal of Applied Psychology, 1954, 38, 419-422.

Super, Donald E. "A Theory of Vocational Development." American Psychologist, 1953, 8, 185-190.

Super, Donald E. The Psychology of Careers. New York: Harper, 1957.

Super, Donald E., Crites, J. O., Hummel, R. C., Moser, Helen P., Overstreet, Phoebe L., and Warnath, C. F. Vocational Development: A Framework for Research. New York: Bureau of Publications, Teachers College, Columbia University, 1957.

Super, Donald E. and Overstreet, Phoebe L. The Vocational Maturity of Ninth Grade Boys. New York: Bureau of Publications, Teachers College, Columbia University, 1960.

Super, Donald E. "Some Unresolved Issues in Vocational Development Research." Personnel and Guidance Journal, 1961, 40, 11-25.

Super, Donald E. "The Structure of Work Values in Relation to Status, Achievement, Interests, and Adjustments." Journal of Applied Psychology, 1962, 46, 231-239.

Super, Donald E. "The Definition and Measurement of Early Career Behavior: A First Formulation." Personnel and Guidance Journal, 1963, 41, 775-779.

Super, D. E., Starishevsky, R., Matlin, N. and Jordaan, J. P. Career Development: Self-Concept Theory. New York: College Entrance Examination Board, 1963.

Super, Donald E. "Vocational Development Theory: Persons, Positions, and Processes." The Counseling Psychologist, 1969, 1, no. 1.

Super, Donald E. "Vocational Development Theory in 1988: How Will It Come About?" The Counseling Psychologist, 1969, 1, no. 1.

Tatsuoka, M. M. Joint Probability of Membership and Success in a Group: An Index which Combines Analysis as Applied to the Guidance Problem. Cambridge: Harvard Studies in Career Development, number 6, 1957.

Thomas, Lawrence G. The Occupational Structure and Education. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1956.

Thompson, O. E. "Occupational Values in High School Students." Personnel and Guidance Journal, 1966, 44, 850-853.

Thorndike, Robert L. and Hagen, Elizabeth. 10,000 Careers. New York: Wiley, 1959.

Tiedeman, David, V. "The Utility of the Discriminant Function in Psychological and Guidance Investigations." Harvard Educational Review, 1951, 21, 71-80.

Tiedeman, David V. "Decision and Vocational Development: A Paradigm and its Implications." Personnel and Guidance Journal, 1961, 40, 15-20.

Tiedeman, David V. and O'Hara, Robert P. Career Development: Choice and Adjustment. New York: College Entrance Examination Board, 1963.

United States Department of Labor. Dictionary of Occupational Titles: Volume II. Washington: U.S. Government Printing Office, 1965. (3rd Edition).

Wall, Harvey W., Osipow, Samuel H. and Ashby, Jefferson D. "SVIB Scores, Occupational Choices, and Holland's Personality Types." Vocational Guidance Quarterly, 1967, 15, 201-205.

Weiss, David J., Dawis, Rene U., Lofquist, Lloyd H., Tinsley, Howard E. A. and Waruken, Robert G. "A Follow-up Survey of Former Clients of the Minnesota Division of Vocational Rehabilitation." Minnesota Studies in Vocational Rehabilitation: XXVI, 1969.

Werts, C. E. "Path Analysis: Testimony of a Proselyte." American Journal of Sociology, 1968, 73, 509-512.

Whinfield, Richard W. A Comparative Study of Selected Characteristics of Post High School Students in Terminal Programs and Students in Transfer Programs Who Do Not Complete a Bachelor's Degree. Doctoral thesis, University of Wisconsin, 1969.

Wysong, H. E. "The Use of the General Aptitude Test Battery in Grades Nine and Ten." Personnel and Guidance Journal, 1965, 43, 508-512.

Young, Raymond J. Eastern Iowa Community Occupational Survey: A Study of the Needs for Post-High School Education in the Eastern Iowa Community College District. Bettendorf, Iowa: Eastern Iowa (ERIC ED 027-410)

Zytowski, Donald G. "The Concept of Work Values." Vocational Guidance Quarterly, 1970, 18, 176-186.